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The social dimension of territorial cohesion

Geographic visions

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Abstract

There is a relative consensus about the multidimensional nature of territorial cohesion, encompassing economy, environment and society. However, its social dimension is rarely analysed (Faludi 2003, Schön, 2005). Following the Reports on Cohesion and EU ministerial meetings on spatial planning, this social dimension namely means “accessibility to basic services and facilities”. The lack of attention is usually explained by a lack of data.

This paper proposes a way to overcome the crucial challenges of data availability. The objective is to show the interest of tackling social questions at a local scale (i.e a combination of LAU (Local Administrative Unit) 1 and 2 in the European context) and its feasibility: an appropriate methodology may provide interesting results even with a limited set of data. The methodology relies on the fuzzy sets theory. This theory helps identifying influence areas of service providers following different policy perspectives: the minimum offer of services; the overlap between influence areas; or the territorial weaknesses in terms of unique membership to a service provider. The combination of these three perspectives gives an image of the various situations of the LAU in terms of access to basic services.

The results of the methodology underline crucial challenges in the definition of the concept of territorial cohesion. Firstly, the question of redistribution is raised – if a European cohesive territory means an equal access of citizens to basic services, how to achieve this goal in spite of different national traditions in the organisation and use of services? Secondly, the concept helps putting back the citizens at the heart of the analysis, as well as their needs in everyday life. This is worth considering, in a time of general scepticism about the European Union in terms of remoteness from everyday concerns, although this raises also the question of the European model of society in which the European citizens recognize.

The social dimension of territorial cohesion

Geographic visions¹

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The concept of territorial cohesion deals not only with the issue of regional disparities. It also deals with the question of accessibility to “essential services and basic facilities”, according to the latest European political documents like the 4th Report on Cohesion. Addressing this topic requires a new kind of methodology adapted to the new geographical scale considered.

The scale to be considered is necessarily local, at a more precise level than the NUTS3 which is usually used in European applied research programmes like ESPON. This study must be seen first as a contribution on the definition of the concept of “territorial cohesion”, secondly as a preparatory work for further local/social studies across Europe. Moreover, the interest of such a study is also to ask questions meaningful for EU inhabitants’ everyday life.

1. Accessibility to Basic Services: Challenges for a Reproducible Method in the European Space, at Local Level

As far as accessibility to basic services is concerned, the reliability of results is a matter of scale. The more precise level of analysis adopted in ESPON projects, i.e. NUTS3, looks inappropriate: the mean size of NUTS3 units is around 50 km from one side to the other, while the question of access to services concerns lower distances. For instance, within the same NUTS3 the distance to the nearest hospital may vary from 0 to 40 km, and this situation cannot be summarized without considering the internal structure of the NUTS3. Such differences within a given NUTS3 have been proved in a Belgian preliminary research whose purpose was to combine the distance to the closest hospital and older people’s mortality rates. The study considers hospitals having emergency services, and shows that the mortality rates significantly increase when the distance to the hospital exceeds six kilometers².

This situation raises three challenges:

1. Which territorial local units must be considered? The LAU2 is not harmonised across the European countries (for instance the French LAU2 are five times smaller than the Belgian ones), and this situation cannot always be solved by a combination of LAU1 and 2 (eight EU countries, including France and Belgium, have no LAU1 partition). This work has benefited from the TPG 3.4.3 inputs on the Modifiable Area Unit Problem.

¹ The methodology has been developed within the ESPON3.2 project. For further information: ESPON3.2 final report, 2007, volume 4, p.170-197:

http://www.espon.eu/mmp/online/website/content/projects/260/716/file_4018/fr-3.2_final-report_vol4r.pdf

² Research done by Alice Romainville (IGEAT / ULB), as a part of the “Demography” volume of the Belgium National Atlas.

2. Which data can be used? The current ESPON database does not comprise data at lower levels than NUTS3. One of the only databases existing at LAU has been made out for the purpose of the “Mountain study” (project achieved for the European Commission by a consortium led by Nordregio, and completed later to cover the entire ESPON space). This database has been tested in the context of the specific needs of our research. As a result, there are important data lacks at such a level (for example the data on deaths and births in Rheinland-Pfalz and Saarland were not available in the database although presented as complete).
3. Which method must be set out? The method must be robust enough to be used in a context of scarcity of data. Our aim is to allow the method to be *reproducible*, i.e. applicable to any regions thanks to *the limited set of data required*.

Particular attention also has to be paid to the situation along national borders. As the basic facilities and essential services are framed within the national contexts, borders are important discontinuity lines in terms of provision and organisation of services. Recently several, mainly bottom-up, cross border initiatives took place to better coordinate services such health. The evaluation of these services is not easy as it is frequently said that each border is typical and the situation cannot be explored except by monographs. Our intention here is to adopt a more top-down approach, through a reproducible method whatever the border context is.

We have tested the method in the so-called “Grande Region” or “Gross Region”. It has been chosen for three reasons: (1) This trans-national area comprises four countries (Belgium, France, Germany, Luxembourg), so it is an interesting place to compare the availability and to initiate the work of harmonisation³; (2) the density of borders is interesting in this region as a way of regarding the eventual complementarities between countries. Moreover, as there is a political will in the *Grande Région* to foster the cooperation between regional authorities, it makes sense to define influence areas of services across the border; (3) the borders between Luxembourg and neighbouring countries are the major economic discontinuities in Western Europe⁴. The disparities of GDP/capita levels in absolute terms are extreme. Important flows of workers converge towards Luxembourg; this leads to enlarge the potential attractiveness of public services.

³ Our participation in previous and ongoing Interreg projects in the Region was the opportunity to gain some knowledge on the territorial trends in this transnational area.

de Ruffray S., Meddahi D., Moron E., 2004, /Contribution à la situation économique de la Grande Région, /Report and atlas made for the Conseil Economique et Social de la Grande Région

de Ruffray S., Meddahi D., Moron E., Smits F., 2005, /A method to delimit cross border labour market: The example of the “Great Region”/, Paper presented at the 14th European Colloquium on Theoretical and Quantitative Geography, Tomar, 9th -13 th September 2005

⁴ See the Annex A of the ESPON3.1 Third Interim Report, “Multiscalar Territorial analysis”, http://www.espon.eu/mmp/online/website/content/projects/260/714/file_1250/3.ir_3.1-full.pdf

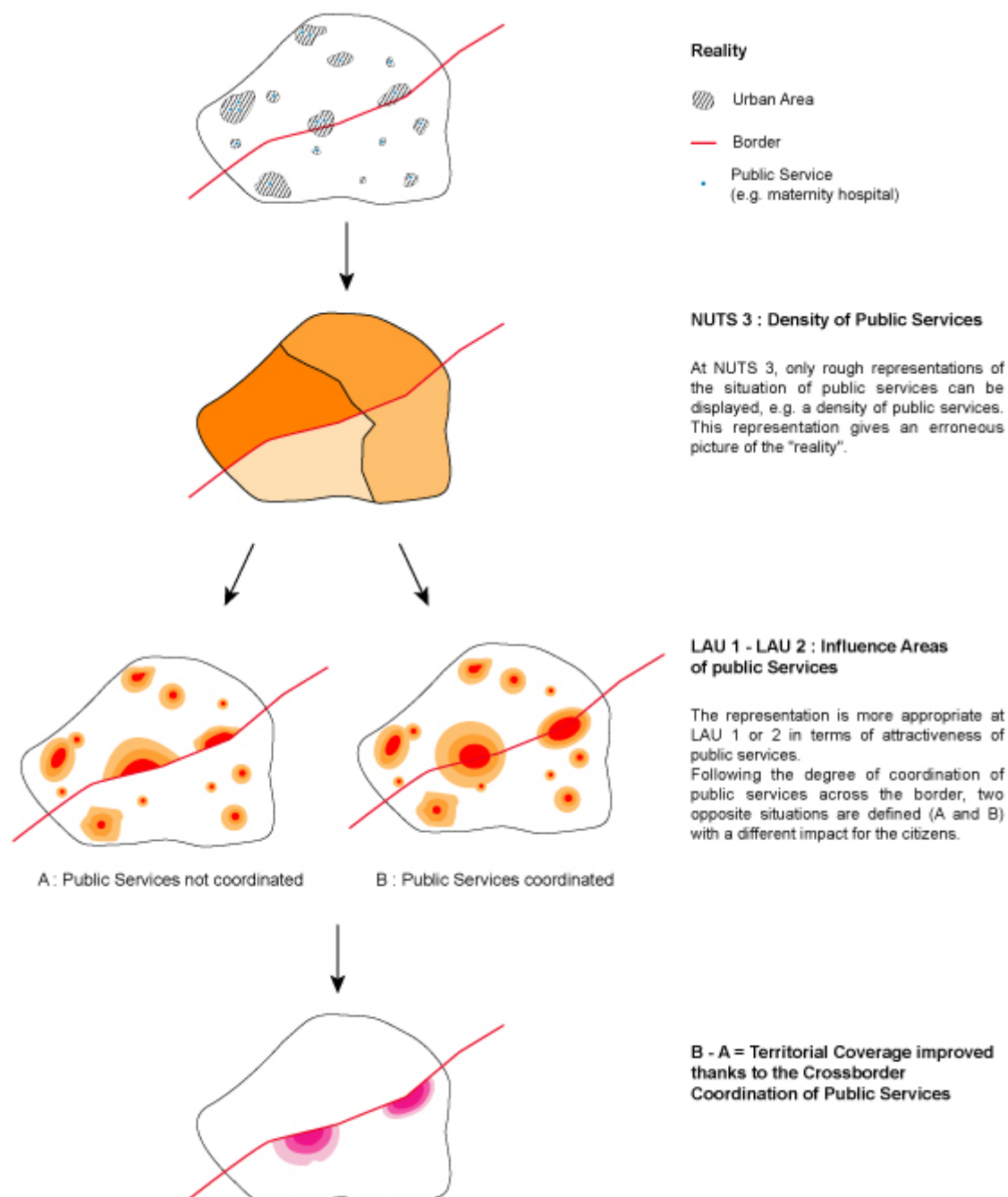


Figure 1: The relevance of LAU 1/2 levels to represent the accessibility to public services

2 Empirical Test: The Accessibility to Maternity Hospitals in the Grande Region

Among the “the basic facilities and essential services”, the maternity hospitals are considered in this empirical test. Given the high diversity in fecundity rates between the countries, especially here between Germany and its neighbours, it was interesting to focus on maternity hospitals in order to assess our results according to the different national trends.

The situation along the national borders with the definition of cross border cooperation sectors is interesting to study. Indeed, the public services and the proximity's equipment are always

listed in the national contexts. The borders are lines of strong discontinuity in terms of localization and organization of the services.

By cross border cooperation we mean a thorough coordination of health services, not limited as it is today to parsimonious projects between isolated health providers⁵. This requires the harmonisation of Social Security systems.

Our methodology consists in taking into account the maternity hospitals of the Region, and to combine the capacity (number of beds in each maternity hospital) and the demand (number of births in each LAU) with the accessibility to each maternity hospitals. In total there are 146 maternity hospitals in the Grande Région. The empirical test concerns all the maternity hospitals located near the borders, because our aim is not to give an exhaustive view of reality but to present the added value of the method.

The idea is that there are no strict limits between the influence areas of maternity hospitals. On the contrary, the LAU can be attracted at the same time by several maternity hospitals. Three main parameters form the conceptual foundations of the delimitation method, designing graduated limits around the maternity hospitals.

They take into account:

- The accessibility in terms of the required time to reach the maternity hospital from each LAU. A threshold of 30 minutes has been empirically decided: when the distance between a LAU and a maternity hospital exceeds 30 minutes, we consider that it cannot be attracted by the maternity hospital and its value is zero. Taking into account various legal speed limits, time is measured for a car travel in optimum conditions without any stop constraint. This parameter brings a time-distance constraint to the maternity hospital area delimitation⁶.
- The capacity that represents the ability of the maternity hospital to attract the women of the LAU is based on both the number of beds (and their *occupation in time*) offered and the number of births in LAU where the maternity hospital is located.
- The demand that represents the lack of beds of the LAU is based on both the number of beds offered and the number of births in LAU.

The method is based on an application of fuzzy sets theory and possibility theory. These theories are adapted to study and formalise spaces which are not strictly delimited, or which are only poorly delimited. For each LAU, a membership value to an influence area is obtained, and for each maternity hospital a membership profile is built. Hence, it is possible to establish the large and small influence areas to which a LAU contributes.

⁵ For the moment, health cross border cooperation usually deals only with emergency services and social protection of borderers. There are numerous other projects on benchmarking, but no global view. See the research-action Interreg IIIA project "Offre de soins et mobilité à l'intérieur de l'espace transfrontalier Lorraine - Grand-Duché de Luxembourg - Province de Luxembourg", 2004, <http://www.santetransfrontaliere.org/luxlorsan/main.htm>

Mission Opérationnelle Transfrontalière, 2001, An assessment of cross border cooperation between hospitals, France - Belgium - Luxembourg - Germany - Italy - Spain - Great Britain - Switzerland <http://www.espaces-transfrontaliers.org/en/studies/santeanglais.pdf>

Mission Opérationnelle Transfrontalière, 2004, La coopération transfrontalière sanitaire. *Les Cahiers de la MOT*, 4, http://www.espaces-transfrontaliers.org/document/cahier_Mot_4.pdf

⁶ The network is made of the different strands

An influence area is a geographical space defined by such characteristics as accessibility, capacity, and demand which differentially affect it. The membership to an influence area may be very high for some places, much less important for another or non-existent for others. The influence area is imprecise since each spatial unit contributes to it at various levels. Normalization and combinations rely on the operators that are taken from possibility theory and from fuzzy set theory which are detailed in the second part.

3. Strengths and weaknesses of the Grande Région LAU : the inhabitants' inequity in the access to maternity hospitals.

Towards a typology of the accessibility to maternity hospitals

A classification based on all the membership values leads to a global vision of the three spatial approaches described above, where each LAU is described following its membership to one or more maternity hospitals areas. Taking not into account the LAU located 30 minutes further away from the maternity hospitals, the distinction between the five classes designs the spatial complexity of the accessibility to basic services at the Grande Région level (figure 49).

The LAU in light blue are in a situation of unique membership to a maternity hospital and deserve the policy maker's full attention. A better cooperation between the social security systems could improve the situation of the ones located close to the national boundaries, for example at the East of the Moselle French département or at the North of the Meuse département. Other LAU are in a more dramatic situation, namely in the Walloon core.

The LAU having a maternity hospital are often represented in dark blue, characterising a high unique membership. This corresponds to different situations, either the inhabitants cannot choose their maternity hospital, or their maternity hospital is particularly attractive (in terms of specialised services like neonatology).

The overlap areas are ranked in three classes displaying more and more privileged situations, from the green class for the mean multi-membership to the red class for the high multi-membership. In the latter the inhabitants can really choose between several close maternity hospitals.

Although the method is developed on a set of limited and elementary data, it displays the rich diversity of possible situations regarding the accessibility to maternity hospitals. Its interest also lies in relation to the 3.2 prospective scenarios work, through designing maternity hospitals' alternative localisations in function of the policy options defined in the scenarios, leading to the computation of inhabitants' accessibility gains and losses.

A Maternity Hospitals' Accessibility Typology

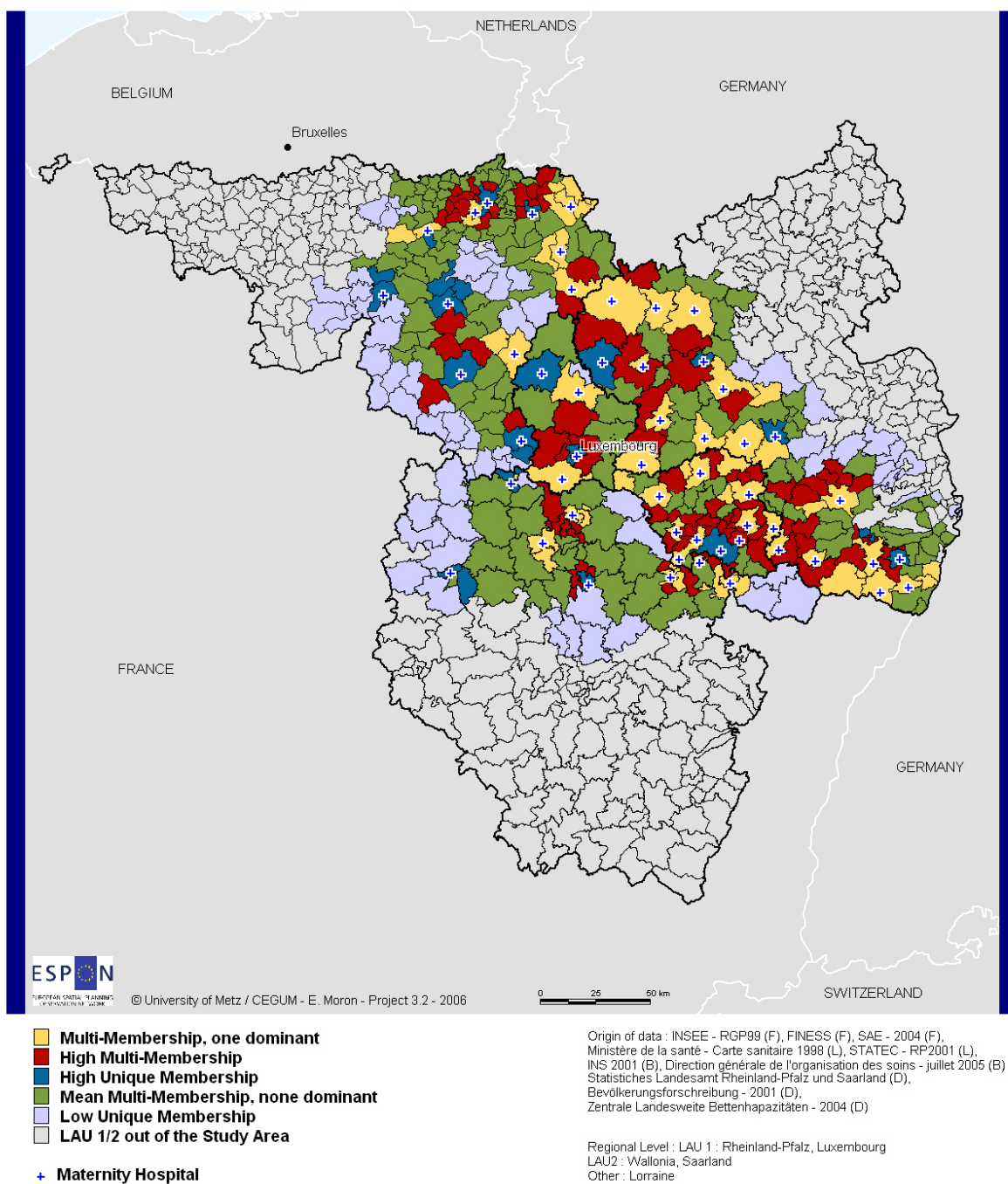


Figure 2. A Maternity Hospitals' Accessibility Typology

3. An Application on Prospective Scenarios : Differences between Competitive and Cohesive Scenarios

The methodology is applied to the competitive and cohesive scenarios. The contrasted policies developed in the scenarios have divergent impacts on the basic and essential services. It is possible to represent the impact for the inhabitants by applying the previously developed method. We will present the hypothesis of each scenario before analyzing the differences of gains and/or losses for the citizens.

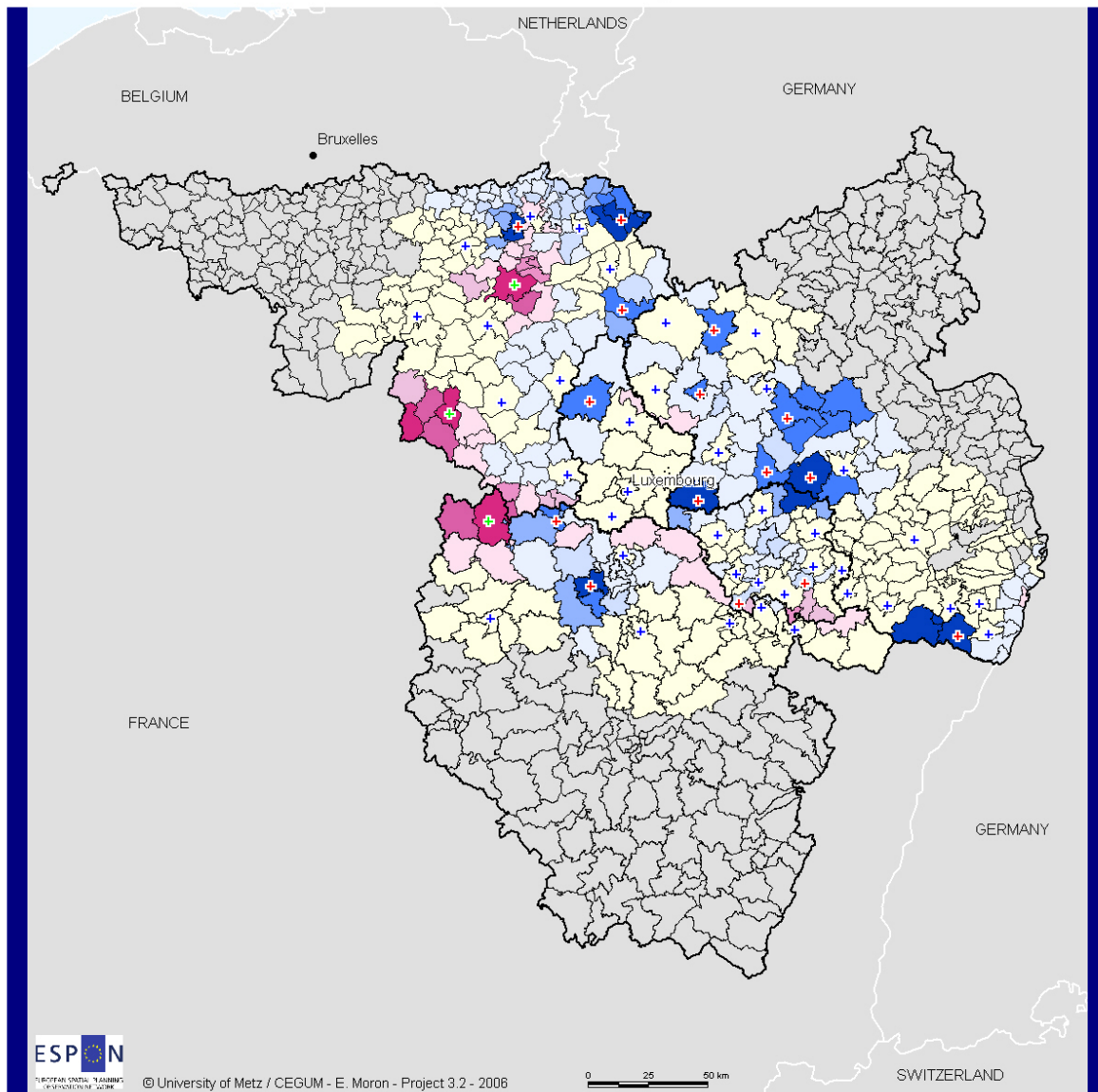
The policy orientation of the cohesive scenario directs the allocation of significant funding to basic infrastructures and services, harmonization of the taxation and social security systems and improvements to the accessibility of rural areas. Particular actions are implemented to restart fecundity, in particular in terms of care to childhood. The accessibility of the small and average cities is reinforced by the improvement of the system of transport and connection with the principal axes. Three hypotheses while designing the network of maternity hospitals follow: (1) hospitals cluster to take advantage of the better and more diversified services of large units; (2) new maternity hospitals are more likely to be established in deprived areas, and (3) women who live near national borders will use maternity hospitals on either side.

The figure 3 presents differences between the LAU membership values in the current situation and in the cohesive scenario. The most striking element is the gain in accessibility from the creation of new maternity hospitals in the Walloon and French rural territories, while there appears to be some loss in the German urban territories. The dark blue colours are only located in the LAU where a maternity hospital has been closed – the situation of these LAU is not dramatic as the closure has taken place to create larger units in the vicinity. This leads to a new balance through a transfer from the over-furnished zones to the derelict ones. Such a movement is an expression of solidarity between the territories, providing an illustration of what could be the “territorial cohesion”.

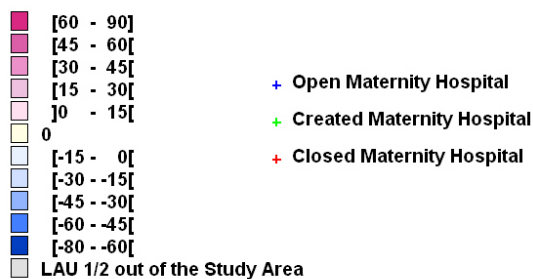
The competitive scenario hypotheses suggest a further privatisation and liberalisation of public services along with a focus of public expenditures that are not related to health, but rather to Lisbon-oriented topics of R&D and education, ICT. If there is less public intervention in general, border inhabitants may benefit from the abolition of barriers to cross-border cooperation. These hypotheses lead to two locational principles that govern maternity hospitals (1) smaller hospitals whose profitability is not ensured (less than 30 beds) are closed, except when no other hospital remains in the neighbourhood to provide a minimum service level, and; (2) women can go to a maternity hospital on the other side of the border.

The figure 4 displays the difference between existing and new maternity hospitals in terms of gains and losses in accessibility. A general loss in accessibility has occurred in the significant number of LAU which are shown in light blue. However, the darker blue pattern of the LAU which have lost a maternity hospital (red crosses) does not signify a catastrophic situation because other hospitals remain in the vicinity (condition for the closing). Little gains in accessibility are observed close to the borders, reflecting the possibility to go to a maternity hospital on the other side of the border. Nevertheless, this general restructuring raises concerns about the impact on the environment of the study population.

**Difference Between Membership Values of LAU 1 and 2 Territories to Maternity Hospitals
(Cohesion Scenario Values Minus Current Scenario Values)**



**Winning and loss between
Competitiveness and Current Scenarios**

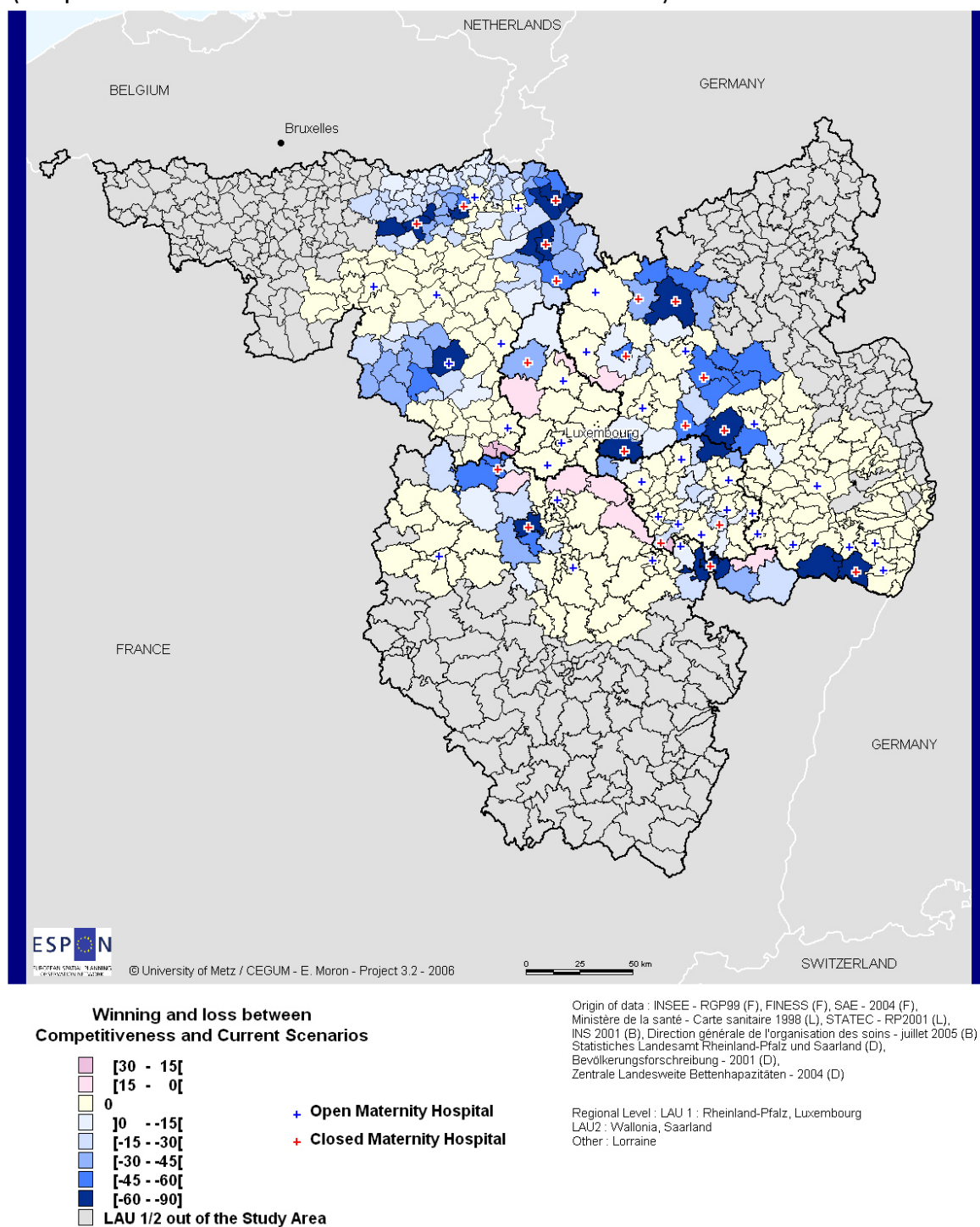


Origin of data : INSEE - RGP99 (F), FINESS (F), SAE - 2004 (F),
Ministère de la santé - Carte sanitaire 1998 (L), STATEC - RP2001 (L),
INS 2001 (B), Direction générale de l'organisation des soins - juillet 2005 (B)
Statistisches Landesamt Rheinland-Pfalz und Saarland (D),
Bevölkerungsforschung - 2001 (D),
Zentrale Landesweite Bettenkapazitäten - 2004 (D)

Regional Level : LAU 1 : Rheinland-Pfalz, Luxembourg
LAU2 : Wallonia, Saarland
Other : Lorraine

*Figure 3. Difference Between Membership Values of LAU 1 and 2 to Maternity Hospitals
(Cohesive Scenario Values Minus Current Scenario Values)*

**Difference Between Membership Values of LAU 1 and 2 Territories to Maternity Hospitals
(Competitiveness Scenario Values Minus Current Scenario Values)**



*Figure 4. Difference Between Membership Values of LAU 1 and 2 to Maternity Hospitals
(Competitive Scenario Values Minus Current Scenario Values)*

The two maps show situations which have advantages and drawbacks whatever the selected scenario. The competitive scenario could be applied in some areas. The cohesive scenario seems to be crucial for the demographic sake of the rural areas.

This method illustrates the interest to apply different scenarios at a local scale.

Conclusion on the Empirical Test

As accessibility to basic facilities and essential services is an inherent component of territorial cohesion, and given the difficulty to achieve reliable results at LAU level across the European area, the proposed method proves several interests. Firstly, it is based on a very small set of data: the number of births in the LAU; the number of beds in each maternity hospital, provided by the national health services; the accessibility between maternity hospitals and LAUs. This ensures the reproducible stake. Secondly, the fuzzy operators look interesting as regards the political meaning of “accessibility to essential services”: on the one hand, the choice of operators determines different visions of accessibility particularly when the inhabitants belong to the influence areas of several services; on the other hand, influence areas have no strict delimitations in reality, and fuzzy operators allow taking this reality into account.

If territorial cohesion keeps being stated as a crucial political stake for the European Union, further local studies such as this one must be launched. In a context of current doubtful expectations regarding the European construction, policy makers and scientists endorse the responsibility to bring concrete answers to the everyday life concerns of inhabitants, on the meaning of the European integration for them. Choosing the maternity hospitals as a type of basic service must here be considered as a first step of a more global study taking into account various services, namely school or transport matters to quote the more important ones. Working out a method integrating the accessibility situations to these different services would allow scientists to provide a more innovative picture of the territory, centred on the concerns of inhabitants.

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